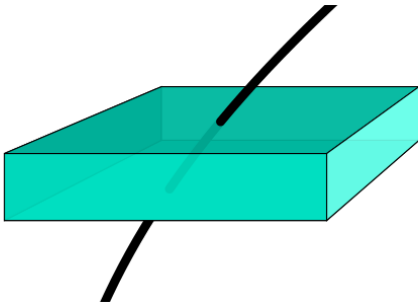


VXD Momentum Estimation using dEdX

F2F tracking meeting.

Nils Braun | 1.9.2015

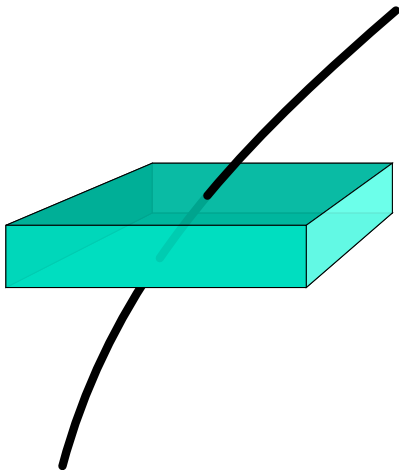


Estimating the momentum for slow pions

For each π^\pm with a momentum < 0.1 GeV:

1. Calculate dE/dX for every hit in the PXD and SVD using the path length calculated with the geometrical sensor information and the ADC count. Correct for different readout.
2. Transform dE/dX to a momentum estimation.
3. Create a new `genfit::Measurement` with this momentum only and include it into the track.
4. Fit using the Kalman or the DAF.

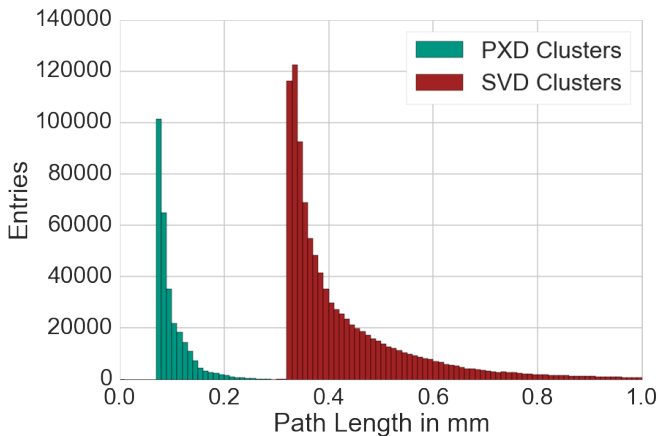
The work is based on ideas in BELLE2-NOTE-TE-2015-030 by R. Maria and I. Ripp-Baudot.



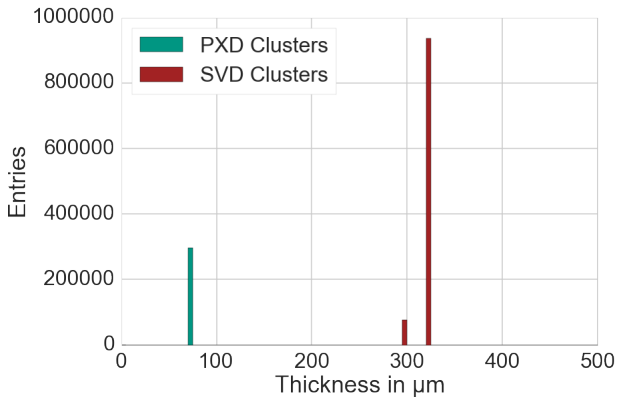
Different possibilities to calculate the path length:

- Use the track finder seeds
- Use MC information at the hit
- Use the MC tracking seed at the origin
- Use the current fit state

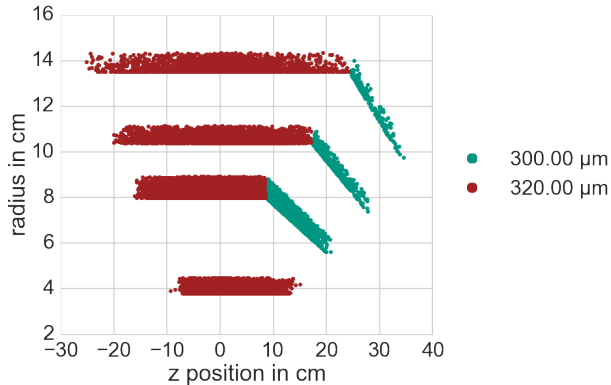
Path Lengths calculated with the Tracking Seed

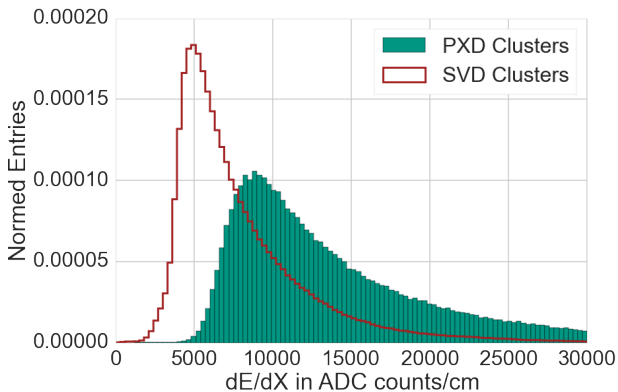


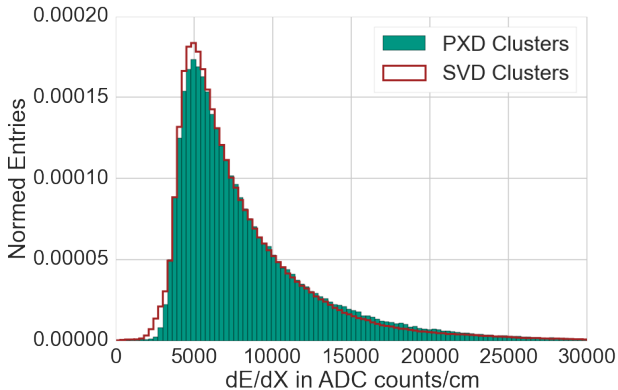
Strange thickness?



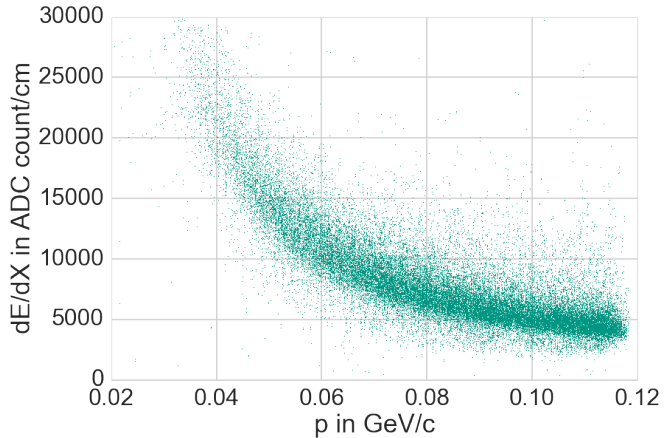
Strange thickness?



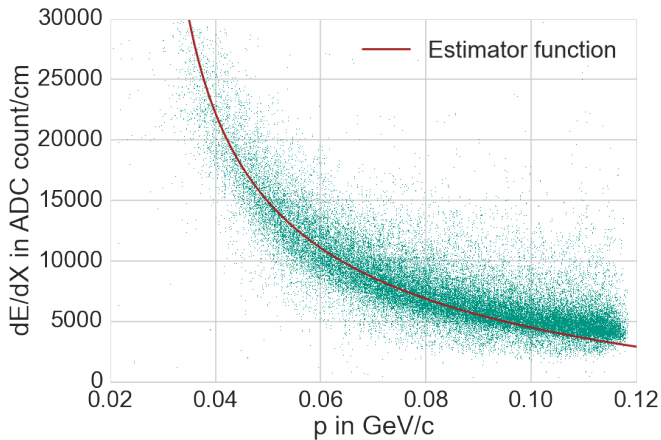


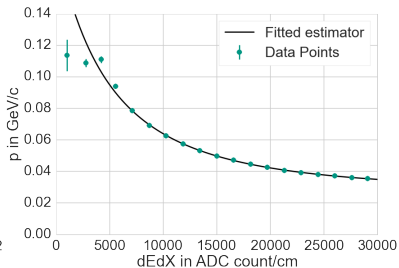
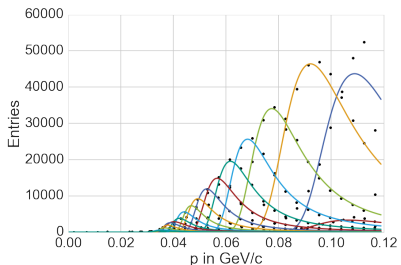


dE/dX over momentum



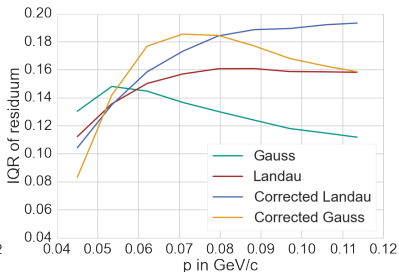
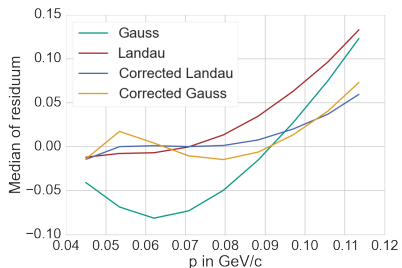
dE/dX over momentum





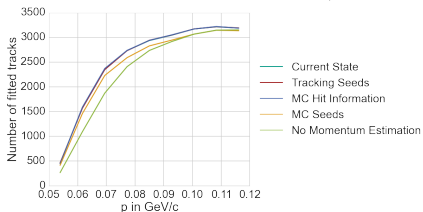
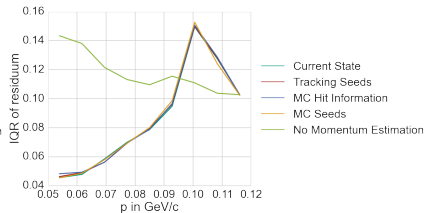
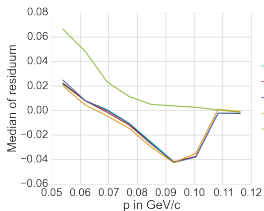
Transforming dEdX to p

- For each dEdX bin: fit the momentum distribution with a landau/gauß function
- Use the parameters of the distributions to calculate a function $p(dEdX)$.

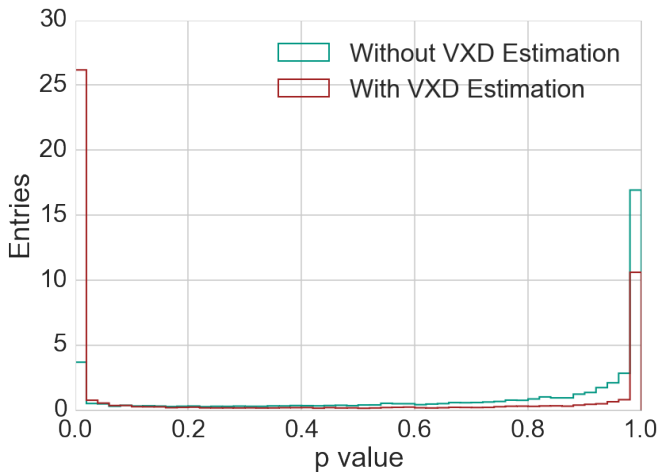


Residuum of the estimated momentum inverse to the correct MC momentum inverse for each hit. The variable going into the fit is q/p .

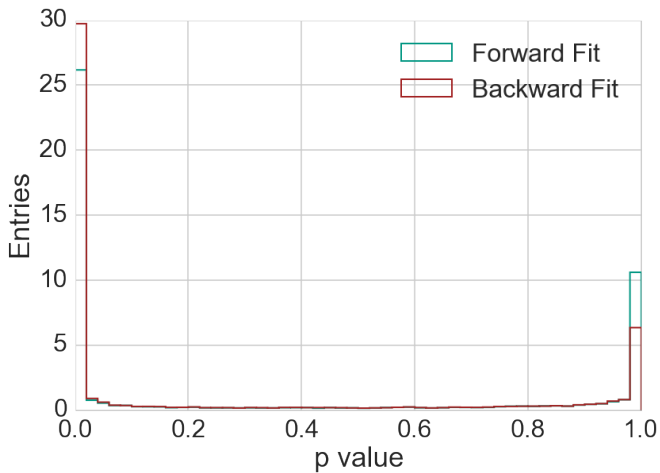
After the fit



P Values



P Values



- Momentum resolution could be increased by using dEdX momentum estimation in the fit.
- Introduced a `MeasurementCreatorModule` and new measurement types to be used for fitting with energy information (→ Markus).
- Need correct handling of σ (p-value is too low)
- How to handle higher momenta?